

## 3.2 Facility Disposition Alternatives

The waste processing alternatives described in Section 3.1 do not include any specific facility disposition options except for those cases where facility disposition is an integral part of implementation of the option (e.g., disposal of low-level waste Class A or Class C type grout in the Tank Farm and bin sets). However, DOE intends to make decisions regarding disposition of HLW facilities (including existing facilities and facilities that would be constructed under the waste processing alternatives).

Existing HLW facilities would be dispositioned under all waste processing alternatives. The facility disposition alternatives are modular in nature and can be integrated with any waste processing alternative or option. However, each waste processing alternative would result in the construction (and the need for ultimate disposition) of a different number of facilities (as described in the following section). Table 3-3 identifies the major facilities that would be constructed for each waste processing alternative.

The facility disposition analysis must consider disposition of currently existing HLW facilities and HLW facilities that would be constructed under the waste processing alternatives. Because most INEEL HLW facilities contain RCRA wastes, the facility disposition alternatives analyzed in this EIS are consistent with RCRA closure requirements. Section 5.3 describes the impacts to the environment of facility disposition alternatives.

### 3.2.1 DESCRIPTION OF FACILITY DISPOSITION ALTERNATIVES

RCRA closure regulations require removal or decontamination of all hazardous waste residues and contaminated containment system components, equipment, structures, and soils during closure. The “remove or decontaminate” standard can be achieved by reducing the amount of residual contamination to levels that are (1) below detection or indistinguishable from background concentrations or (2) at concentrations below levels that may pose an unacceptable

### Facility Disposition

*Facility disposition would include activities performed under multiple regulatory programs to address INTEC facilities that no longer have a mission and must be placed in a condition consistent with future land use decisions and end-state planning for the INEEL. Some of the activities that would be encompassed by the facility disposition alternatives include:*

*Closure – Removal, decontamination, or encapsulation of hazardous and radiological contaminants from regulated facilities in accordance with applicable regulatory requirements.*

*Deactivation – Removal of potentially hazardous (non-waste) materials from the process vessels and transport systems, de-energizing power supplies, disconnecting or reloading utilities, and other actions to place the facility in an interim state that requires minimal surveillance and maintenance.*

*Decommissioning – Decontamination of facilities that have been deactivated. This may include demolition of the facility and removal of the rubble from the site or entombment by means such as collapsing the aboveground portions of the structure into its below-grade levels and capping the contaminated rubble in place or constructing containment structures around the facility.*

*The facility disposition activities are intended to reach an end state where the contamination has been removed, contained, or reduced such that the level of risk associated with the residual contamination is no longer considered a threat to human health or the environment. At that time, DOE could either reuse the facilities for new missions or transfer control of the facilities to others.*

**Table 3-3. Major INTEC facilities<sup>a</sup> or activities required for each waste processing alternative.**

	Alternative/Option								
	No Action	Continued Current Operations	Full Separations	Planning Basis	Transuranic Separations	Hot Isostatic Pressed Waste	Direct Cement Waste	Early Vitrification	Minimum INEEL Processing
Calcine SBW including New Waste Calcining Facility Upgrades	–	●	–	●	–	●	●	–	–
Newly Generated Liquid Waste and Tank Farm Heel Waste Management	–	●	–	●	–	●	●	–	–
Full Separations	–	–	●	●	–	–	–	–	–
Vitrification Plant	–	–	●	●	–	–	–	–	–
Class A Grout Plant	–	–	●	●	–	–	–	–	–
New Analytical Laboratory	–	–	●	●	●	●	●	●	●
Interim Storage of Vitrified Waste	–	–	●	●	–	–	–	–	●
Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository	–	–	●	●	–	–	–	–	●
Class A Grout Disposal in new INEEL Low-Activity Waste Disposal Facility	–	–	●	–	●	–	–	–	● <sup>b</sup>
Class A Grout Packaging and Shipping to new INEEL Low-Activity Waste Disposal Facility	–	–	●	–	–	–	–	–	–
Class A Grout Packaging and Loading for Offsite Disposal	–	–	●	●	–	–	–	–	●
Packaging and Loading Remote-Handled Transuranic Waste at INTEC for Shipment to WIPP	–	–	–	–	●	–	–	–	–
Transuranic Separations	–	–	–	–	●	–	–	–	–
Class C Grout Plant	–	–	–	–	●	–	–	–	–
Class C Grout Packaging and Shipping to New INEEL Low-Activity Waste Disposal Facility	–	–	–	–	●	–	–	–	–
Class C Grout Packaging and Loading for Offsite Disposal	–	–	–	–	●	–	–	–	–
Calcine Retrieval and Transport	● <sup>c</sup>	● <sup>c</sup>	●	●	●	●	●	●	●
Mixing and Hot Isostatic Pressing	–	–	–	–	–	●	–	–	–
Hot Isostatic Pressed HLW Interim Storage	–	–	–	–	–	●	–	–	–

3-51

DOE/EIS-0287D

Idaho HLW & FD EIS

Table 3-3. (continued).

	Alternative/Option									Alternatives
	No Action	Continued Current Operations	Full Separations	Planning Basis	Transuranic Separations	Hot Isostatic Pressed Waste	Direct Cement Waste	Early Vitrification	Minimum INEEL Processing	
Packaging & Loading Hot Isostatic Pressed Waste at INTEC for Shipment to a Geologic Repository	–	–	–	–	–	●	–	–	–	
Direct Cement Process	–	–	–	–	–	–	●	–	–	
Unseparated Cementitious HLW Interim Storage	–	–	–	–	–	–	●	–	–	
Packaging and Loading Cementitious Waste at INTEC for Shipment to a Geologic Repository	–	–	–	–	–	–	●	–	–	
Packaging and Loading Vitrified SBW at INTEC for Shipment to WIPP	–	–	–	–	–	–	–	●	–	
Early Vitrification with Maximum Achievable Control Technology	–	–	–	–	–	–	–	●	–	
SBW and Newly Generated Liquid Waste Treatment with Cesium Ion Exchange to Contact-Handled Transuranic Grout and Low-Level Waste Grout	–	–	–	–	–	–	–	–	●	
Packaging and Loading Contact-Handled Transuranic Waste for Shipment to WIPP	–	–	–	–	–	–	–	–	●	
Calcine Packaging and Loading for Transport to Hanford	–	–	–	–	–	–	–	–	●	
Separations Organic Incinerator	–	–	●	●	●	–	–	–	–	
Waste Treatment Pilot Plant	–	–	●	●	●	●	●	●	●	

a. Some of the facilities listed are not stand-alone facilities but projects that would be implemented in another facility.

b. For vitrified low-level waste fraction returned from Hanford.

c. Calcine retrieval for bin set 1 only

● indicates the facility is associated with the alternative.

Dash indicates the facility is not required

WIPP = Waste Isolation Pilot Plant.

risk to human health and the environment. The Environmental Protection Agency expects that well-designed and well-operated RCRA units (i.e., units that comply with the unit-specific minimum technical requirements) will generally be able to achieve this standard (EPA 1998).

However, based on technological, economic, and worker health risks involved, it may not be practical to remove all of the residual material from the INTEC facilities, decontaminate all equipment, and remove all surrounding contaminated soils to achieve clean closure. The RCRA regulations (40 CFR 264.197) state that if all contaminated system components, structures, and equipment cannot be adequately decontaminated, then the facilities must be closed in accordance with the closure and post-closure requirements that apply to landfills ("closed to landfill standards"). Therefore, DOE is evaluating six potential facility disposition alternatives in this EIS: (1) No Action, (2) Clean Closure, (3) Performance-Based Closure, (4) Closure to Landfill Standards, (5) Performance-Based Closure with Class A Grout Disposal, and (6) Performance-Based Closure with Class C Grout Disposal. Each of these facility disposition alternatives is briefly described below. For all closures, detailed closure plans would be developed and approved to ensure closures are performed in accordance with approved procedures and that risk to workers and the public are minimized and acceptable.

**No Action** – Under the No Action Alternative, DOE would not plan for disposition of its HLW facilities at INTEC. Nevertheless, over the period of analysis from 2000 to 2035, many of the facilities identified in Table 3-4 could be deactivated. This means that bulk chemicals would be removed and the facility could be de-energized. Surveillance and maintenance necessary to protect the environment and the safety and health of workers would be performed in the normal course of INTEC operation. Therefore, the No Action Alternative for facility disposition is substantially the same as No Action for waste processing. As a result, Section 5.3 does not present environmental consequences for the facility disposition No Action Alternative during the period 2000 to 2035. Future facility closures and/or dispositions which are not foreseen at this time would be covered in future National

Environmental Policy Act reviews, as appropriate.

The one difference between the facility disposition and the waste processing No Action Alternatives is the long-term condition of the bin sets and Tank Farm. The calcine in the bin sets and the liquid mixed transuranic waste/SBW in the Tank Farm would have to remain in those facilities because that is the assumption underlying the No-Action Alternative. Over the period of analysis through 2035, continued storage in these two facilities would result in no activities different from those in the waste processing No Action Alternative. However, over the thousands of years beyond 2035, the materials in these facilities would migrate into the environment. To capture these long-term impacts, DOE analyzed the continued storage of calcine and liquid mixed transuranic waste/SBW. The analysis is presented in Appendix C.9, Facility Closure Modeling. The results of the analysis are reported in the water, human health, and ecology subsections of Section 5.3.

**Clean Closure** – Facilities would have the hazardous wastes and radiological contaminants, including contaminated equipment, removed from the site or treated so the hazardous and radiological contaminants are indistinguishable from background concentrations. Clean Closure may require total dismantlement and removal of facilities. This may include removal of all buildings, vaults, tanks, transfer piping, and contaminated soil. This alternative would require a large quantity of soil for backfilling and would also require topsoil for revegetation. Use of the facilities (or the facility sites) after Clean Closure would present no risk to workers or the public from hazardous or radiological components.

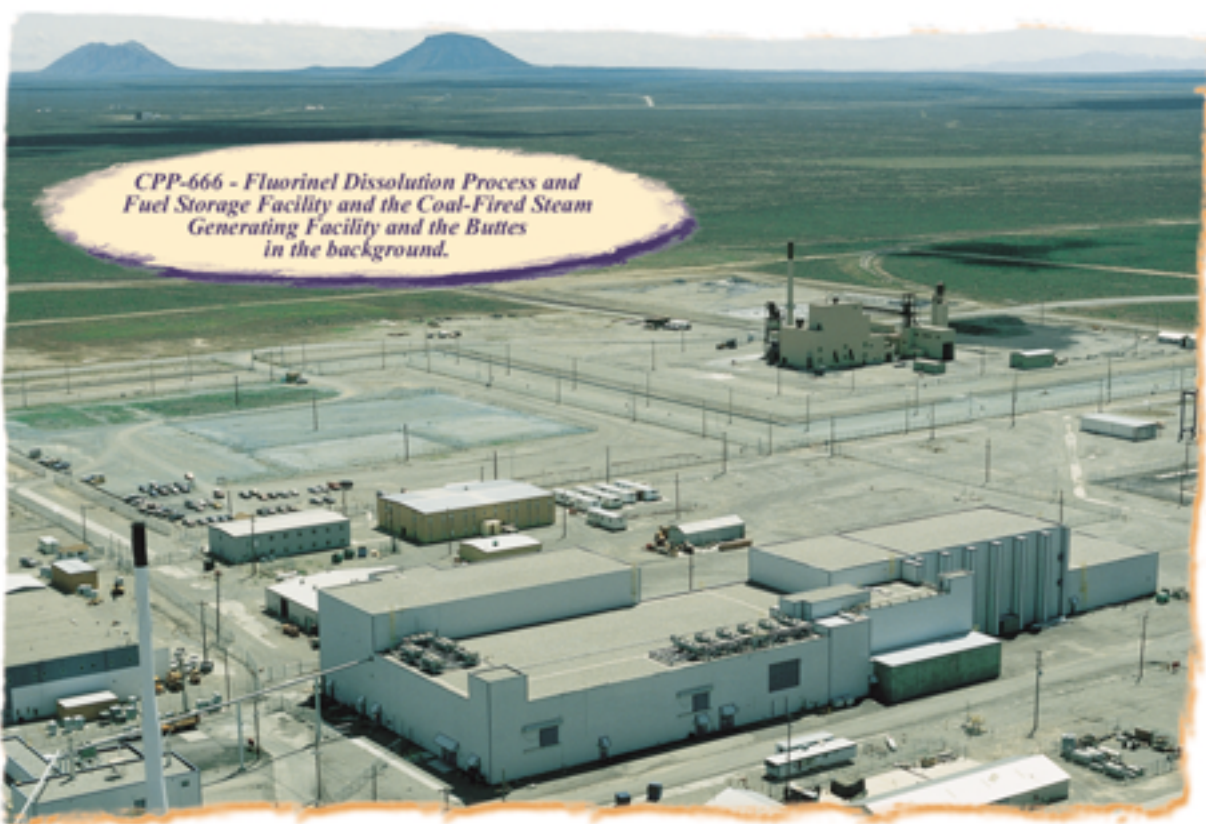
**Performance-Based Closure** – Closure methods would be dictated on a case-by-case basis depending on risk. For radiological and chemical hazards, performance-based closure would be in accordance with risk-based criteria. Under this alternative, most above-grade structures would be razed and most below-grade structures (tanks, vaults, and transfer piping) would be decontaminated and left in place. This alternative would require some topsoil for revegetation but would require minimal amounts of soil for backfilling. Any remaining facilities would be

**Table 3-4. Facility disposition alternatives.**

Facility Description	Facility Disposition Alternative				
	Clean Closure	Performance-Based Closure	Closure to Landfill Standards	Performance-Based Closure with Class A Grout Disposal	Performance-Based Closure with Class C Grout Disposal
<b>Tank Farm and Related Facilities</b>					
Tank Farm <sup>a</sup>	●	●	●	●	●
CPP-619 – Tank Farm Area – CPP (Waste Storage Control House)			●		
CPP-628 – Tank Farm Area – CPP (Waste Storage Control House)			●		
CPP-638 – Waste Station (WM-180) Tank Transfer Building			●		
CPP-712 – Instrument House (VES-WM-180, 181)			●		
CPP-717 – STR/SIR Waste Storage Tank Pads (A, B, C, and D) and Vessels			●		
<b>Bin Sets and Related Facilities</b>					
Bin sets <sup>b</sup>	●	●	●	●	●
CPP-639 – Blower Building/Bin Sets 1, 2, 3			●		
CPP-646 – Instrument Building for 2 <sup>nd</sup> Set Calcined Solids			●		
CPP-647 – Instrument Building for 3 <sup>rd</sup> Set Calcined Solids			●		
CPP-658 – Instrument Building for 4 <sup>th</sup> Set Calcined Solids			●		
CPP-671 – Instrument Building for 5 <sup>th</sup> Set Calcined Solids			●		
CPP-673 – Instrument Building for 6 <sup>th</sup> Set Calcined Solids			●		
<b>Process Equipment Waste Evaporator and Related Facilities</b>					
CPP-604 – Process Equipment Waste Evaporator			●		
CPP-605 – Blower Building			●		
CPP-641 – West Side Waste Holdup	●				
CPP-649 – Atmospheric Protection Building			●		
CPP-708 – Exhaust Stack/Main Stack <sup>c</sup>			●		
CPP-756 – Pre-Filter Vault			●		
CPP-1618 – Liquid Effluent Treatment and Disposal Facility	●				
NA – PEWE Condensate Lines			●		
NA – PEWE Condensate Lines and Cell Floor Drain Lines			●		
<b>Fuel Processing Building and Related Facilities</b>					
CPP-601 – Fuel Processing Building		●	●		
CPP-627 – Remote Analytical Facility Building		●	●		
CPP-640 – Head End Process Plant		●	●		
<b>FAST and Related Facilities</b>					
CPP-666 – Fluorinel Dissolution Process and Fuel Storage Facility		●			
CPP-767 – Fluorinel Dissolution Process and Fuel Storage Facility Stack	●				

Table 3-4. (continued).

Facility Description	Facility Disposition Alternative				
	Clean Closure	Performance-Based Closure	Closure to Landfill Standards	Performance-Based Closure with Class A Grout Disposal	Performance-Based Closure with Class C Grout Disposal
Transport Lines Group					
NA – Process Off-gas Lines		●			
NA – High-Level Liquid Waste (Raffinate) Lines			●		
NA – Process (Dissolver) Transport Lines		●			
NA – Calcine Solids Transport Lines			●		
Other HLW Facilities					
CPP-659 – New Waste Calcining Facility <sup>d</sup>		●	●		
CPP-684 – Remote Analytical Laboratory		●			
<p>a. The INTEC Tank Farm consists of underground storage tanks, concrete tank vaults, waste transfer lines, valve boxes, valves, airlift pits, cooling equipment, and several small buildings containing instrumentation and valves for the waste tanks. Includes waste storage tanks (VES-WM-180 through 190), Tank Vaults for Tanks VES-WM-180 through 186 (CPP-780 through 786), Tank Enclosure for Tanks VES-WM-187 through 190 (CPP-713), and facilities CPP-721 through 723, CPP-737 through 743, and CPP-634 through 636, and CPP-622, 623, and 632.</p> <p>b. The bin sets consist of ancillary structures, instrument rooms, filter rooms, cyclone vaults, and stacks, including CSSF-1 through 7, CPP-729, CPP-732, CPP-741 through 742, CPP-744, CPP-746 through 747, CPP-760 through 761, CPP-765, CPP-791, CPP-795, and CPP-1615.</p> <p>c. Includes the instrument building for Main Stack CPP-692 and waste transfer line valve boxes.</p> <p>d. Includes Organic Solvent Disposal Building CPP-694.</p> <p>STR = Submarine Thermal Reactor, SIR = Submarine Intermediate Reactor</p> <p>PEWE = Process Equipment Waste Evaporator.</p>					



## Alternatives

decontaminated, such that residual waste and contaminants no longer pose any unacceptable exposure (or risk) to workers or to the public. Post closure monitoring may be required on a case-by-case basis.

**Closure to Landfill Standards** – The facility would be closed in accordance with the state and Federal requirements for closure of landfills. Closure to landfill standards is intended to protect the health and safety of the workers and the public from releases of contaminants from the facility. Under this alternative, waste residuals within tanks, vaults, and piping would be stabilized with grout in order to minimize the release of contaminants into the environment. Once waste residues are stabilized, protection of the environment could be accomplished by installing an engineered cap, establishing a groundwater monitoring system, and providing post-closure monitoring and care of the waste containment system, depending on the type of contaminants.

Several of the waste processing options result in production of a low-level waste fraction, which would then be grouted and disposed of either in (1) a near-surface disposal facility on the INEEL, (2) the Tank Farm and bin sets, or (3) an offsite disposal facility. Disposal of this low-level waste in the Tank Farms and bin sets would occur after these facilities have been closed under the Performance-Based Closure alternative. In order to accommodate the use of the Tank Farm and bin sets for disposal of the low-level waste fraction, this EIS also will evaluate two additional facility disposition alternatives for the Tank Farm and bin sets.

**Performance-Based Closure with Class A Grout Disposal** – The facility would be closed as described above for the Performance-Based Closure alternative. Following completion of those activities, the Tank Farm or bin sets would be used to dispose of low-level waste Class A type grout produced under the Full Separations Option.

**Performance-Based Closure with Class C Grout Disposal** – The facility would be closed as described above for the Performance-Based Closure alternative. Following completion of those activities, the Tank Farm or bin sets would

be used to dispose of low-level waste Class C type grout produced under the Transuranic Separations Option.

DOE has completed a comprehensive evaluation for the cleanup program at INTEC (known as Waste Area Group 3) under the requirements of CERCLA. Under this CERCLA program (Federal Facility Agreement and Consent Order), DOE, EPA, and the State of Idaho have made decisions regarding the disposition of environmental media, such as contaminated soils and water. Under this CERCLA program, DOE will continue to make decisions regarding the final state of the INTEC after all cleanup and facility closure activities have been completed. While this CERCLA program is not the subject of this EIS, decisions regarding disposition of HLW facilities are being coordinated with decisions made in the CERCLA program. Activities under the CERCLA program also contribute to the cumulative impacts presented in Section 5.4 of this EIS. Chapter 6 provides further details on the CERCLA program at INTEC.

### 3.2.2 PROCESS FOR IDENTIFYING CURRENT FACILITIES TO BE ANALYZED

DOE used a systematic process to identify which existing INTEC facilities would be analyzed in detail under the facility disposition alternatives in this EIS. The first step was to perform a complete inventory of all INTEC facilities (Wichmann 1998; Harrell 1999). Next, DOE identified which of these facilities are directly related to the HLW Program (i.e., HLW treatment, storage, or generation facilities). This EIS includes detailed analysis for all such facilities. DOE plans to consider this analysis, together with other factors such as mission, policy, technical considerations, and public comments in its final decision(s) about the disposition of these facilities.

DOE assumes that other INTEC facilities will have residual amounts of radioactive and chemical contaminants at closure, and has included the environmental impacts of these facilities in the cumulative analysis discussions in this EIS. However, disposition decisions about other INTEC facilities are not within the scope of this

EIS. A list of other INTEC facilities analyzed for their contributions to cumulative impacts can be found in Section 5.4.2.

For the significant HLW facilities, DOE considered which of the facility disposition alternatives would be most appropriate to analyze for each facility. The determination of the applicable disposition methods was based on the facility and residual waste characteristics. A list of the existing HLW facilities and the applicable facility disposition alternative is provided in Table 3-4.

For the Tank Farm and bin sets, which together constitute the great majority of the total inventory of residual radioactivity, DOE analyzed all five facility disposition alternatives. These facilities would be the main contributors to the residual risk at INTEC. The level of residual risk would vary with the different facility disposition alternatives for the Tank Farm and bin sets.

The residual amount of radioactive and/or chemical contaminants associated with other INTEC facilities is much less than that of the Tank Farm and bin sets. Consequently, the overall residual risk at INTEC would not change significantly due to the contribution from these other facilities. For purposes of analysis, DOE assumed a single facility disposition alternative for the other INTEC HLW facilities, except for the New Waste Calcining Facility and the Fuel Processing Building and related facilities for which two facility disposition alternatives were evaluated.

For the new HLW facilities identified in Table 3-3, DOE analyzed the Clean Closure alternative. This facility disposition assumption is based on the DOE policy (DOE Order 435.1) that new HLW facilities that would be constructed under the waste processing alternatives would be designed to facilitate a high degree of decontamination.

### 3.3 Alternatives Eliminated from Detailed Analysis

This section identifies those alternatives that have been eliminated from detailed analysis in this EIS and to briefly discuss why they have

been eliminated [40 CFR 1502.14(a)]. Council on Environmental Quality regulations direct all agencies to use the National Environmental Policy Act process to identify and assess a reasonable range of alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment [40 CFR 1500.2(e)]. The Council on Environmental Quality guidance further states that: (1) reasonable alternatives include those that are practical or feasible from a technical, economic, or common sense standpoint; (2) the number of reasonable alternatives considered in detail should represent the full spectrum of alternatives meeting the agency's purpose and need; and (3) the EIS need not discuss every unique alternative when a large number of reasonable alternatives exists.

This section seeks to consolidate the alternatives that serve the same general purpose by eliminating from detailed study those alternatives that present strong cost, schedule, regulatory, and technical maturity or feasibility constraints and offer no significant advantages over alternatives selected for detailed analysis. While cost alone is not normally a criterion for eliminating an alternative from detailed study, it is a powerful discriminator when coupled with the existence of similar but more cost-effective alternatives. Appendix B and DOE (1998e, 1999c) describe the process DOE used to identify the set of reasonable alternatives for analysis in this EIS. For the reasons discussed below, DOE has decided to eliminate the following alternatives from detailed study:

- Separations Alternative – Transuranic Separations/Class A Type Grout Option
- Non-Separations Alternative – Vitrified Waste Option
- Non-Separations Alternative – Cement-Ceramic Waste Option
- Disposal of Low-Level Waste Class A or Class C Type Grout at the Hanford Site
- Vitrification at the West Valley Demonstration Project or the Savannah River Site

## *Alternatives*

- Shipment of Mixed Transuranic Waste (SBW/Newly Generated Liquid Waste) to the Hanford Site for Treatment
- Treatment of Mixed Transuranic Waste/SBW at the Advanced Mixed Waste Treatment Project

### **3.3.1 SEPARATIONS ALTERNATIVE TRANSURANIC SEPARATIONS/ CLASS A TYPE GROUT OPTION**

This option is similar to the Full Separations Option, except the separation process under this option would result in three waste products:

- Transuranic waste
- Fission products (primarily strontium/cesium)
- Low-Level Waste Class A type grout

In the Transuranic Separations/Class A Type Grout Option, the liquid mixed transuranic waste/SBW would be sent directly to the Separations Facility for processing into high-level and low-level waste fractions. After the mixed waste transuranic waste/SBW is processed, the calcine would be retrieved from the bin sets, dissolved, and processed in the Separations Facility. Ion exchange columns would be used to remove the cesium from the waste stream. The resulting effluent would undergo the transuranic extraction process to remove the transuranic elements for eventual shipment to the Waste Isolation Pilot Plant. Then, strontium would be removed from the transuranic extraction effluent stream via the strontium extraction process. The cesium and strontium would be combined to produce a HLW fraction that would be vitrified into borosilicate glass. The transuranic fraction would be treated to produce a solid waste, and the low-level fraction would be grouted to form low-level waste Class A type grout.

The Transuranic Separations/Class A Type Grout Option was eliminated after comparison to the Transuranic Separations Option described earlier in Section 3.1.3.3. The Transuranic Separations (Class C Type Grout) Option pro-

cess would create only two primary waste streams: (1) solidified transuranic fraction for disposal at the Waste Isolation Pilot Plant and (2) a low-level waste fraction to form Class C type grout for onsite disposal. The Transuranic Separations/Class A Type Grout Option would involve more separations steps than the Transuranic Separations (Class C Type Grout) Option and would require a higher capacity Waste Separations Facility. Also, the Transuranic Separations/Class A Type Grout Option would require a separate HLW Treatment (Vitrification) Facility and a HLW Interim Storage Facility that have an estimated total cost substantially greater than the Transuranic Separations (Class C Type Grout) Option.

Thus, the Transuranic Separations (Class C Type Grout) Option is similar, has less complex separations processing, and is less costly than the Transuranic Separations/Class A Type Grout Option. Moreover, the environmental impacts of this option are expected to be bounded by the remaining two options under the Separations Alternative. For these reasons, the Transuranic Separations/Class A Type Grout Option was eliminated from further consideration in this EIS.

### **3.3.2 NON-SEPARATIONS ALTERNATIVE - VITRIFIED WASTE OPTION**

In the Vitrified Waste Option under the Non-Separations Alternative, all the mixed transuranic waste/SBW in the Tank Farm would be calcined in the New Waste Calcining Facility. The New Waste Calcining Facility would be upgraded to comply with the Maximum Achievable Control Technology emission requirements. The calcine stored in the bin sets would be retrieved and vitrified in a Vitrification Facility to form a HLW borosilicate glass. The molten glass would be poured into canisters similar to those used by the Defense Waste Processing Facility at the Savannah River Site. These glass canisters would be stored at INEEL pending shipment to a geologic repository.

The facilities that would be constructed under the Vitrified Waste Option would include

Calcine Retrieval, High-Activity Waste Vitrification Plant (larger scale than for the Full Separations Option), HLW Interim Storage, New Waste Calcining Facility upgrade for Maximum Achievable Control Technology, and a New Analytical Laboratory.

The Early Vitrification Option described in Section 3.1.4.3 would be similar to the Vitrified Waste Option, except the Early Vitrification Option would not require calcination of the liquid mixed transuranic waste/SBW prior to its vitrification. Thus, in the Vitrified Waste Option, the additional calcine produced from mixed transuranic waste/SBW would be combined with the HLW calcine and then vitrified to produce a large number of canisters (14,000 canisters versus 11,700 canisters under the Early Vitrification Option) for disposal at a geologic repository. In the Early Vitrification Option the mixed transuranic waste/SBW would be vitrified directly without calcining to produce a transuranic waste product suitable for disposal at the Waste Isolation Pilot Plant. This early vitrification of the liquid mixed transuranic waste/SBW would allow the resulting remote-handled transuranic waste canisters to be shipped directly to the Waste Isolation Pilot Plant.

In summary, the Vitrified Waste Option would not retain the beneficial segregation of the mixed transuranic waste/SBW that would be achieved by the Early Vitrification Option. This nonsegregation would result in a larger quantity of vitrified HLW being shipped to a geologic repository for disposal with the attendant higher disposal costs. The Vitrified Waste Option would also require greater facility costs for calcining the liquid mixed transuranic waste/SBW with the Maximum Achievable Control Technology upgrades to the New Waste Calcining Facility. Therefore, this option offers no advantages over the Early Vitrification Option that otherwise contains the same treatment concepts. For these reasons, the Vitrified Waste Option was eliminated from further consideration in this EIS.

### 3.3.3 NON-SEPARATIONS ALTERNATIVE - CEMENT- CERAMIC WASTE OPTION

The Cement-Ceramic Waste Option under the Non-Separations Alternative is similar to the Direct Cement Option except the liquid mixed transuranic waste/SBW would not be calcined directly but would be mixed with the existing-mixed HLW calcine to form a slurry. In this option, all calcine would be retrieved and combined with the liquid mixed waste transuranic waste/SBW. The combined slurry would be recalcined in the New Waste Calcining Facility with the resulting calcine mixed into a concrete-like material. The concrete waste product would then be poured into drums, autoclaved (cured in a pressurized oven), and placed in an interim storage facility awaiting shipment to a geologic repository. An estimated 16,000 concrete canisters would be produced. This option would require a major modification to the New Waste Calcining Facility to allow slurry calcination and the upgrade for compliance with the Maximum Achievable Control Technology rule, and a Grout Facility with autoclave. The final product (concrete or ceramic) would require an equivalency determination by EPA under the RCRA land disposal restrictions.

The rationale for initially considering the Cement-Ceramic Waste Option in the EIS was the anticipated potential for significant cost savings in using a greater confinement disposal facility (such as that at the Nevada Test Site) as the final repository for the resulting product. A basis for this assumption was that the cementitious waste form of the Cement-Ceramic Waste Option and the alluvial soil at the greater confinement facility would be chemically compatible, and the cement waste form would be the least likely to migrate in the surrounding soil. However, a greater confinement facility for HLW disposal has not been studied, approved, or constructed. In addition, if INEEL were the only site disposing HLW at a greater confinement disposal facility, the INEEL could potentially bear all costs associated with the development of the

## *Alternatives*

repository (e.g., site characterization and performance assessments associated with U.S. Nuclear Regulatory Commission licensing and EPA certification of compliance). Therefore, it is unlikely that significant cost savings at a greater confinement facility (assuming it could be licensed) could be realized over a geologic repository, where INEEL would expect to pay only a prorated share of the development and operational costs based on its share of the waste disposed of.

Even if the Cement-Ceramic Waste Option had a high potential to reduce life cycle costs, the Direct Cement Waste Option has lower technical risk than the Cement-Ceramic Waste Option, which eliminates the need to include the Cement-Ceramic Waste Option as a discrete option. The Cement-Ceramic Waste Option is based on calcination of liquid mixed transuranic waste/SBW and calcine slurry in the New Waste Calcining Facility, which is currently configured to process a liquid feed. To reconfigure the New Waste Calcining Facility to process a liquid mixed transuranic waste/SBW and calcine slurry could present a potentially costly technical challenge. No prior research and development work has been conducted to verify the feasibility of such an operation. Thus, a significant technical risk would remain for this process. For these reasons the Cement-Ceramic Waste Option was eliminated from further consideration in this EIS.

### **3.3.4 DISPOSAL OF LOW-LEVEL WASTE CLASS A OR CLASS C TYPE GROUT AT THE HANFORD SITE**

Each of the options under the Separations Alternative would produce a low-level waste grout. DOE initially considered the Hanford site as a representative location for disposal of this grout at a non-INEEL DOE site. However, previous evaluations of low-level waste grout disposal at Hanford have indicated that the long-term (beyond 1,000 years) impacts of low-level waste grout disposal could exceed regulatory standards for groundwater protection (WHC

1993). Hanford's current HLW management strategy (62 FR 8693; February 26, 1997) calls for vitrifying the low-level waste fraction prior to onsite disposal. It is unlikely that Hanford would be able to accept grouted INEEL low-level waste for disposal. Therefore, disposal of low-level waste grout at the Hanford Site was eliminated from further consideration in this EIS.

### **3.3.5 VITRIFICATION AT THE WEST VALLEY DEMONSTRATION PROJECT OR THE SAVANNAH RIVER SITE**

As previously described, DOE is evaluating transportation of stabilized HLW (calcine or separated HLW fraction) to DOE's Hanford Site for vitrification, with the borosilicate glass product being shipped back to INEEL for interim storage pending shipment to a geologic repository. DOE also considered shipment of the stabilized HLW to the West Valley Demonstration Project in New York or the Savannah River Site in South Carolina for vitrification. However, the West Valley Demonstration Project Vitrification Facility is not a candidate for treatment of INEEL HLW since the facility will be shut down according to Public Law 96-368 (1980) and DOE plans to cease operations at West Valley by 2006. Therefore, the West Valley facilities would not be available at the time when the INEEL HLW was ready for processing (Murphy and Krivanek 1998).

Earlier studies concluded that chemical incompatibilities with the Savannah River Site melter would exist because of the presence of fluorides (in calcine) or phosphate (in separated HLW fraction). Significant life cycle costs would be incurred to replace equipment that is beyond design basis life or constructed of materials that are incompatible with INEEL HLW

Therefore, shipment of stabilized HLW to the West Valley Site or the Savannah River Site for vitrification was eliminated from further consideration in the EIS.